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THE AGRICULTURE OF THE AMERICAN INDIANS PRIOR TO THE EUROPEAN CONQUEST*

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The aboriginal American Indian made many contributions to our present-day civilization.(1) Not the least of these were his agricultural plants, methods, and processes. It has been estimated that four-sevenths of the total agricultural production of the United States, measured in farm values, consists of economic plants, domesticated by the Indian and taken over by the white man.(2) In taking possession of the continents of the Western Hemisphere, among the first lands utilized by the Europeans were the clearings made by the Indians for their crude farms.(3) The whites attempted to use their European crops and methods, but found it necessary to adopt many of those in use among the Indians. Out of the union of American Indian and European farming came the first solution of the food-quest problem of the colonists and the beginnings of American agriculture. Herein lies the reason we can not ignore the agriculture of the American Indians in any adequate study of the history of agriculture in the United States.

Anthropologists tell us that the remote ancestors of the American Indian came from Asia some ten thousand or more years ago while in the Neolithic stage of development. At that time they had no food supply in the form of domesticated plants and animals, nor did they know how to use metals. Their only implements were bows and arrows, stone axes and knives. The same was true of the tribes that remained behind in the Eastern Hemisphere. Eventually, each group developed a stable food supply from the plants and animals at hand, entirely ignorant of the way the other was solving the same problem.(4) In this connection H. J. Spinden's chronological and economic diagram of the parallelism between the development of the civilizations of the Eastern and Western hemispheres is of interest.(5)

* A revision and condensation of the introduction to the writer's Agriculture of the American Indians; A Classified List of Annotated Historical References, issued by the U. S. Department of Agriculture Library as its Bibliographical Contributions 23 (2d ed. Washington, 1933), prepared primarily for use in the course on the history of American agriculture given in the Graduate School of the U. S. Department of Agriculture. The numbers in parentheses refer to the footnotes assembled at the end of the text.

For a long time the descendants of these first immigrants to America knew nothing of agriculture, but eventually tribes in the highlands of Mexico and Central America began the practice of protecting the plants relied on as their main source of food. Then, perhaps considerably later, they began to weed and, in a crude way, cultivate them. Still later, they undertook systematic gathering of seeds and roots for planting in protected areas. This invention of agriculture in the Western Hemisphere which occurred six or seven thousand years ago made possible notable advances in human culture.(6)

The flowering of the Mayan civilization which began about 1000 B.C. was based upon the economic conquest of the humid tropics. The Mayas not only modified the old series of plants to meet wet-land conditions but also domesticated indigenous plants. The cacao plant, representations of whose pods appear as details of several sculptures at Copan dating from the fifth century A.D., was tended and chocolate prepared from its seeds. Other plants were also brought under cultivation, among them the papaya, the anona, the avocado, and the zapote.(7)

As a result of the gradual spread of the cultivation of maize, beans, and squashes to the north and south, agriculture came to be practiced in widely scattered parts of the Western Hemisphere. The process of distribution was slow, for gradual acclimating of the cultivated plants to localities farther and farther from their original tropical or sub-tropical homes required many centuries. To supplement these non-indigenous plants, however, local plants were brought under cultivation in the several regions. In South America the most important indigenous plant was the potato, a native of the Andes.(8) In the Amazon valley, the manioc, the sweet potato, the pineapple, and the peanut were developed as sources of food. For North America, above Mexico, the indigenous food plants similarly utilized were limited to the Jerusalem artichoke and the strawberry. Had it not been for their natural abundance the blueberry and the cranberry would probably also have been domesticated.

Following Clark Wissler, the eminent anthropologist, we may conveniently comprehend the Western Hemisphere, when dominated by the American Indian, as divided into eight major food areas.(9) Beginning in the north and coming southward, they may be outlined as follows: the caribou area, a vast territory with Arctic and sub-Arctic characteristics; the salmon area, a section of the Pacific slope, centering in the Columbia River basin; the area of wild nuts and seeds, in California and a portion of the interior; the bison area, to the eastward, embracing the heart of the Northern Continent; the eastern maize area, the region of annual rainfall of twenty inches or more, from the Gulf of Mexico northward to the Great Lakes and the St. Lawrence; the area of intensive agriculture with maize as its main crop, beginning at the Colorado River and extending through the Isthmus and the Andean region to the lower part of Chile; the manioc area, in the interior of South America centering in the Amazon basin, small game and cultivated manioc being the important foods; the guanaco area, in the lower part of the Southern Continent where the chief food was the flesh of the guanaco. The eight areas thus outlined may be grouped as follows: three hunting areas, one fishing area, three agricultural areas, and one, an area of gatherers of wild seeds.

Although flesh was the main food in the three great hunting areas, many vegetal products were also used. Even in the Arctic zone where the staple food is meat, the Eskimo gathers berries and edible roots. Likewise, the natives of the caribou area relied on them to a considerable extent. In the bison area, cherries, plums, strawberries, and several species of roots were a part of the food supply. In the guanaco area the natives supplement their meat with the nuts of the Aucaria imbricata, a kind of pine tree, eating them either raw, boiled, or roasted. Here too, the seeds of the algeroba, or mesquite tree, are also used. In the treeless parts of Patagonia, as was true in the more arid portions of the bison area, the prickly pear is utilized. In the interior of the salmon area several species of roots were gathered, dried, and pounded into a food product; here the chief root relied on was camas.(10)

The most characteristic food in the area of wild seeds, especially in central and southern California, was the acorn.(11) It was stored in large basket bins. As tannic acid is present in the acorn, the acid was removed by pounding the kernels to a flour and then boiling this with lye from wood ashes. After washing out the lye with clean water the meal was made into a kind of bread or cake. As supplementary foods, several varieties of wild seeds, roots, herbs, and grasses prevailed. Although sufficient food was available, California was unfavorable to the development of the primitive tribes; the daily routine of gathering food was too arduous and time-consuming to afford leisure for progress.

In the eastern maize area, where the Englishmen, who were the first colonial farmers of the future United States of America, settled, corn was the main agricultural product, although many species of wild plants were utilized. For details of the methods and processes employed by the Indians in this area, see the careful treatment of the subject by Philip Alexander Bruce in his Economic History of Virginia in the Seventeenth Century, 1:71-188 (New York and London, 1896), and the summary by Clark Wissler in his article entitled "Aboriginal Maize Culture as a Typical Culture-Complex," in the American Journal of Sociology, 21:656-660 (March 1916). Excerpts from these considerations are reprinted in L. B. Schmidt and E. D. Ross, editors, Readings in the Economic History of American Agriculture, 40-52 (New York, 1925).

Wild rice was so important in the Great Lakes region as to become almost a staple.(12) In the northern part of the eastern maize area, the supplementary food crops were squash and beans; in the southern part, melons, gourds, sweet potatoes, and also a kind of millet.(13) In the latter section also, tobacco was grown extensively, its cultivation being carried on as far north as the climate permitted.(14) In addition to the food plants mentioned, maple sugar was an important item of diet, especially in the northern part of the area.(15) The Indians developed practically every essential detail of the present process of its manufacture. In the south, oil was derived from hickory nuts and walnuts. Along the Gulf coast, persimmons were used for a kind of bread. The tribes in the lower Mississippi Valley acquired hogs, chickens, and European fruit trees so early that many explorers reported them indigenous.

The area of intensive agriculture was almost entirely within the torrid zone, extending to about 35° on either side of the equator. Within its limits were the most advanced Indian cultures, notably that of the Aztecs, the Mayas, and the Incas.(16) In this area hunting was not carried on to the extent that it can be classified as an occupation, and the men as well as the women worked in tilling the fields. To the north, the pueblo people of what is now southwestern United States and northern Mexico, although specializing in corn, gave considerable attention to beans, melons, squashes, pumpkins, onions, chili peppers, and sunflower seeds.(17) Cotton and tobacco were also cultivated. Here too, turkeys were raised for their eggs and feathers as well as for their flesh. The agriculture of the Nahuas and Mayas to the south was even more highly organized. The Chibcha peoples of Colombia raised maize, potatoes, sweet potatoes, manioc, beans, tobacco, coca, and cotton. The other peoples of Colombia, although they did more hunting, also cultivated corn. At the time of the Spanish conquest the adjoining highlands of Venezuela were occupied by a hunting and maize-growing group. At that time, Ecuador, then partly controlled by the Inca empire, depended on corn as the main source of food except in the highest altitudes, where quinoa took its place. The agriculture of the Inca empire, centering in what is now Peru, was highly organized. Here the plants were about the same as in the Andean region. In favorable places manioc, beans, gourds, ground nuts, tomatoes, guava, and fiber plants were raised.

In the Amazon basin manioc or cassava took the place of corn, and the other crops commonly grown were tobacco, cotton, and potatoes. Maté or Paraguay tea was a unique product.

The following is a list of the more important plants cultivated by the American Indians prior to the voyage of Columbus in 1492.(18)

Name	Area of Cultivation
Agave, or aloe (<u>Agave americana</u> Linn.)	Mexico to Chile
Alligator pear (<u>Persea gratissima</u> Geartn. f.)	Central America and West Indies
Arrowroot (<u>Maranta arundinacea</u> Linn.)	Tropical America
Barnyard grass (<u>Echinochloa crusgalli</u> (L.) Beauv.)	Mexico and southern United States
Bean, kidney (<u>Phaseolus vulgaris</u> Linn.)	Distribution same as maize
Bean, lima (<u>Phaseolus lunatus</u> L., var. <u>macrocarpus</u> Benth.)	Brazil and Peru
Cacao (<u>Theobroma cacao</u> Linn.)	Tropical America
Capsicum or Chili pepper (<u>Capsicum annuum</u> Linn. and <u>Capsicum frutescens</u> Linn.)	Tropical America
Cashew nut (<u>Anacardium occidentale</u> Linn.)	Tropical America
Coca, or cocaine (<u>Erythroxylum coca</u> Lamarck)	Peru and Bolivia
Corn (See maize)	
Cotton (<u>Gossypium barbadense</u> Linn.)	Tropical America
Gourd (<u>Cucurbita pepo</u> var. <u>ovifera</u> Linn.)	Distribution same as maize
Guava (<u>Psidium guajava</u> Linn.)	Tropical America
Jerusalem artichoke (<u>Helianthus tuberosus</u> Linn.)	Mississippi Valley
Maize (<u>Zea mays</u> Linn.)	See map on p. 20 of Wissler
Manioc (<u>Manihot utilissima</u> Pohl.)	See map on p. 20 of Wissler
Maté or Paraguay tea (<u>Ilex paraguariensis</u> St. Hil. and <u>Ilex conocarpa</u> Reiss.)	Paraguay and western Brazil
Papaw (<u>Carica papaya</u> Linn.)	Brazil
Peanut (<u>Arachis hypogaea</u> Linn.)	West Indies and Central America
Pineapple (<u>Ananas sativus</u> Schult. f.)	Peru and Brazil
Potato (<u>Solanum tuberosum</u> Linn.)	Mexico and Central America
Prickly pear or Indian fig (<u>Opuntia ficus-indica</u> Mill.)	Chile and Peru
Pumpkin (<u>Cucurbita pepo</u> Linn.)	Mexico
Quinine (<u>Cinchona calisaya</u> Wedd.)	Temperate North America
(<u>Cinchona officinalis</u> Linn.), and others	Bolivia and Peru
Quinoa (<u>Chenopodium quinoa</u> Willd.)	Bolivia and Peru
Squash (<u>Cucurbita maxima</u> Duchesne)	Colombia and Peru
Sweet potato (<u>Ipomoea batatas</u> Poir.)	Tropical America
Tobacco (<u>Nicotiana tabacum</u> Linn.) and other species	Temperate America
Tomato (<u>Lycopersicum esculentum</u> Mill.)	See map on p. 26 of Wissler
	Peru

Too much emphasis can not be placed upon the fact that American Indian agriculture centered in corn(19),— one or more of its distinct types, namely dent, flint, flour, sweet, and pop corn, being grown almost everywhere. As a rival manioc was successful only in localities where the climate was too moist for corn. Quinoa displaced it in the highest altitudes of the Andes.

Investigations made thus far seem to show that maize was developed from a wild grass of the Maya habitat, and this deduction seems logical since distribution of varieties from this center would account for the uniformity of its culture. The data at hand indicate that the distinct types or kinds of corn were already in existence when Europeans discovered America and that they were grown side by side in the same fields. There was, of course, considerable local adaptation of the widely scattered varieties. Certain of them had been perfected by the Hidatsa of the upper Missouri to ripen within the limits of their short growing season, and the Pueblo tribes of Arizona and New Mexico had developed varieties with long, deep-growing roots to reach the moisture in their arid fields. "The time required to stabilize all these forms and the subsequent precision of domestic routine that preserved their racial integrity to the present among some of the surviving natives, is one of the most impressive facts" in the history of corn.(20) The Indians had many ways of preparing corn for eating; for the most part, our present-day methods are those originally developed by the Indians, a striking illustration of how completely the white colonist absorbed the maize complex.

As with corn, so with beans and squashes, both were carried far from their wild types and given a wide range in climatic adaptation. In fact, the range for all three is wider than that of any comparable plants originating in the Eastern Hemisphere. "Squashes and pumpkins are tremendously differentiated yet there are believed to be only two basic species. Also there are two basic species of the legumes we now call beans, namely the Phaseolus vulgaris and the Phaseolus lunatus, but out of these come more varieties than can be mustered by the peas and lentils of the old World...."(21)

Planting corn, potatoes, beans, and other plants of New World origin in hills and then heaping the earth about their stalks during cultivation is still a fundamental process in our present-day farming just as broadcast seeding is essential in growing the grains of Old World origin. In growing their crops, the Indians had neither draught animals nor plowing machinery; all the work was done by hand. Pointed and spade-like tools were used in turning the soil. Only a single digging stick was used in the eastern United States. Here, and also in the West Indies, crude hoes were made from shells or bones. In the area of intensive agriculture, the spades were provided with foot-rests to facilitate their use.

Artificial fertilization was practiced from Nova Scotia to Chile. One of the most widely prevalent methods was to place fish in the corn hills during planting. In parts of the area of intensive agriculture manures were used.

Irrigation was undertaken from Arizona to Chile, and in Peru it was carried out on a scale scarcely equalled by modern peoples. The remains of the aqueduct systems of the Inca empires in the Andes show genius and organization we of today may well respect.

The Indians had few domesticated animals. The dog was the only one practically universal among them, and he was used for transportation, hunting, protection and companionship, or food, the use differing according to locality. Use for transportation was limited to the caribou and bison areas and narrow fringes of adjoining regions. Mexico and the pueblo region had no land transport except human carriers, but farther south in the Andes the Incas had llamas and alpacas. The llamas were raised in herds, sometimes numbering thousands, and were not only used in transportation but sheared for their wool and slaughtered for their flesh. The use of milk, however, was unknown to the tribes of the Americas. Other domestications include the guinea pig by the Incas, the turkey by the tribes of Mexico and southwestern United States, and the keeping of bees by the Aztecs, Mayas, and certain of the lesser tribes.

The introduction of domesticated animals from the Old World resulted in important changes in the life of the Indians. Mules and donkeys were introduced by the Spaniards in the intensive maize area. Cattle, brought from Europe, eventually became wild and overran Texas and southern California, and in the Pampas they became almost as numerous as the bison on the Great Plains of the northern continent. Their presence greatly modified the food supply, and in so doing, also changed the living habits and status of the Indians. The introduction of horses effected an even more drastic change in Indian life. By direct instruction or by self-initiated imitation, the natives of the bison and guanaco areas acquired the technique of rearing and training horses, and to a certain extent their use spread from these two regions. They were common in the more open parts of the eastern maize area. The greatly increased mobility incident to their use tended to rapidly revert the Indians from agriculture to hunting.(22)

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FOOTNOTES

- 1/ Everett E. Edwards, "American Indian Contributions to Civilization," in Minnesota History, 15:255-272 (September 1934).
- 2/ Herbert J. Spinden, "The Population of Ancient America," in the Geographical Review, 18:641-660 (October 1928), and "Thank the American Indian," in the Scientific American, 138:330-332 (April 1928).
- 3/ See, for example, P. A. Bruce, Economic History of Virginia in the Seventeenth Century, 1:71-188 (New York and London, 1896); Hu Maxwell, "The Use and Abuse of Forests by the Virginia Indians," in the William and Mary College Quarterly Historical Magazine, 19:73-104 (October 1910); and C. C. Willoughby, "The Virginia Indians in the Seventeenth Century," in the American Anthropologist, 9:57-86 (January-March 1907).
- 4/ H. J. Spinden, "Thank the American Indian," in the Scientific American, 138:330-332 (April 1928); Clark Wissler, The American Indian; An Introduction to the Anthropology of the New World (2d ed. New York, 1922).
- 5/ "The Population of Ancient America," in the Geographic Review, 18:645 (October 1928).
- 6/ H. J. Spinden, "The Invention and Spread of Agriculture in America," in the American Museum Journal, 17:181-188 (March 1917), and "The Origin and Distribution of Agriculture in America," in the International Congress of Americanists, 19th, Washington, 1915, Proceedings, p. 269-276 (Washington, 1917); N. I. Vavilov, "Mexico and Central America as the Principal Center of Origin of Cultivated Plants of the New World," in the Bulletin of Applied Botany, of Genetics and Plant Breeding (Leningrad) 26:135-199 (1931).
- 7/ See the references cited under the title Maya Agriculture in the present writer's Agriculture of the American Indians; A Classified List of Annotated Historical References, p. 22-23 (U.S. Department of Agriculture Library Bibliographical Contributions 23. Washington, 1933).
- 8/ W. E. Safford, "The Potato of Romance and of Reality," in the Journal of Heredity, 16:112-126, 174-185, 217-230 (April-June 1925).
- 9/ The American Indian, 1-27 (New York, 1922). Note especially the maps on p. 2, 20, 26.
- 10/ H. J. Spinden, "The Nez Percé Indians," in the American Anthropological Association, Memoir, 2 (3):200-207 (November 1908); Harry Turney-High, "Cooking Camas and Bitter Root," in the Scientific Monthly, 36:262-263 (March 1933).
- 11/ C. H. Merriam, "The Acorn," in the National Geographic Magazine, 34:129-137 (August 1918).
- 12/ A. E. Jenks, "The Wild Rice Gatherers of the Upper Lakes," in the U. S. Bureau of American Ethnology, Annual Report (1897-98) 19 (2):1013-1137 (Washington, 1900); Diamond Jenness, "Wild Rice," in the Canadian Geographical Journal, 2:477-482 (June 1931). For additional references see the citations in the present writer's Agriculture of the American Indians, p. 45-46.
- 13/ Lyman Carrier, The Beginnings of Agriculture in America, 22-78 (New York, 1923).

- 14/ For references on tobacco among the Indians see the present writer's Agriculture of the American Indians, p. 42-44.
- 15/ A. F. Chamberlain, "The Maple amongst the Algonkian Tribes," in the American Anthropologist, 4:39-43 (January 1891), and "Maple Sugar among the Indians," in ibid., 4:381-383 (October 1891); H. W. Henshaw, "Indian Origin of Maple Sugar," in ibid., 3:341-351 (October 1890).
- 16/ For references on the Aztecs see the present writer's Agriculture of the American Indians, p. 15-16; for the Mayas, see ibid., p. 22-23; for the Incas, see ibid., p. 16-21.
- 17/ For references on the agriculture of the Indians of southwestern United States, see ibid., p. 25-28.
- 18/ The list is based largely on Wissler, The American Indian, 15. It may be supplemented by those of G. K. Holmes, in the Cyclopedia of American Agriculture, 4:25-29 (New York, 1912), and of U. P. Hedrick, A History of Agriculture in the State of New York, 31-33 (Albany, 1933).
- 19/ A. C. Parker, Iroquois Uses of Maize and other Food Plants (Albany, 1910). For additional references on corn among the Indians, see the present writer's Agriculture of the American Indians, p. 30-39.
- 20/ Wissler, The American Indian, 23.
- 21/ Spinden, in the Scientific American, 138:330-332 (April 1928).
- 22/ For references on the horses among the Indians, see the present writer's Agriculture of the American Indians, p. 47-49.

